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THE  
SOVIET  
REVIEW

A JOURNAL OF TRANSLATIONS

SOCIAL ANALYSIS & CRITICISM  
LITERATURE & THE ARTS  
SCIENCE & TECHNOLOGY

VOLUME 1 | NUMBER 1 | AUGUST 1960

A Plea for Poetry **M. Tikhonov**

A Soviet View of Einstein **I. E. Tamm**

The Nature of Work in the Future Communist Society **L. N. Kogan**

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### **PUBLISHER'S ANNOUNCEMENT**

The purpose of **THE SOVIET REVIEW** is to provide the American reader with a cross-section of articles published in Soviet periodicals in the fields of literature and the arts, social analysis and criticism, and science and technology. The editors will select the most penetrating, most representative and most important articles published in the Soviet Union in each major area.

**THE SOVIET REVIEW** makes these translations available for information and research, and the publication of an article implies neither approval nor disapproval of its contents. The editors cordially invite correspondence from the readers.

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## A Plea for Poetry

By Nikolai Tikhonov

This is an affirmation of the relevance of poetry in the nuclear age by a leading Soviet poet. Tikhonov also directs some critical comments at the literary efforts of some younger contemporaries. [“The Great Truth of Poetry,” *Voprosy Literatury*, 1960, No. 5—abridged.]

We have recently heard, more than once, that poetry has outlived its day, that in this epoch of penetration of the cosmos, in this atomic era, in this day of computers and of every conceivable type of synthetics, people are ceasing to read verse, there is little market for it, little demand, little interest. The time of poetry has passed.

But consider. Announcement was made, not long ago, of a full-dress discussion of poetry, and to this discussion, held in that city famed for its poetry, Leningrad, there came more than 150 poets from the various republics and from many cities of the Russian Federation. And the hall in the Maiakovskii House could not hold all those who wished to hear the discussion. It was necessary to provide public address systems in other places. Each evening, poets of the older and the younger generations spoke forth in our city. Whether it was in the recreation center of an industrial enterprise or that of a neighborhood, in the Small Hall of the Philharmonic or at the University—the rooms were jammed with people with a passionate absorption in poetry.

If every one of the poets who came to the city had been in a position to spend an entire month speaking, each evening, before listeners constituting the most varied types of audiences, thousands of persons desirous of hearing poetry would still have been turned away.

The quantity of verse now being printed in newspapers and in our major and minor journals is many times greater than in the pre-revolutionary era.

The further one moves Eastward, the greater this hunger for poetry. In India, that land friendly to us, one witnesses today the flourishing of the "Mushaira" which is the designation they give to poetry gatherings among the people. Many such assemblies are held in all parts of that enormous country. In Bombay alone, the poets and their listeners gather four or five times each year for "Mushaira." With the setting of the sun, the audiences seat themselves right on the ground and listen to the poets by lamp or torchlight the night through. Sometimes the audiences will exceed 25,000 persons. Poets young and old are among the readers. The people are attentive, and listen to the poets with a full understanding of the force of verse. If a poet of national renown appears, he is greeted by an ovation. Every good metaphor, every bold image, every remarkable turn of phrase or ringing rhythm is met by excited approval. They drive away the poor, incomprehensible, precious versifier. They distinguish the weak imitator from the real poet and criticize him aloud.

\* \* \*

The peoples hunger for poetry. In the time of the bitter war in Vietnam, poets were continuously present at the front with readings of lyrics, verse, marching songs, playlets in the form of poetry, which were studied by performers and performed for the soldiers of the People's Army. Their songs and verses penetrated into the cities ahead of the advancing army of freedom. In People's China, songs and verse accompanied the army both during the Great March, and through the entire course of their lengthy and heroic struggle. Not long ago in Peking I heard a most unlikely chorus of generals and marshals singing before the guests at the 10th anniversary celebration of the Chinese People's Republic the songs of the unforgettable years in which these generals and marshals had begun their lives as soldiers. The songs had not grown old. They rang out with their former, and I would even say, with a new force.

In the Middle Ages everyone who deemed himself educated had to master the art of composing lines of verse. It was necessary to be able to write, in verse form, a letter to one's friend,

a message to the lady of one's heart, a description of voyages to far-off lands or of a stroll on the outskirts of town.

Today, when so many events are occurring that excite the hearts of Soviet people, the desire to express their feelings in verse is very great indeed. Every professional poet can tell you how he is swamped by versifiers from the farthest corners of our country. So much poetry is written that it is impossible even to reply to all the letters of this type that one receives. The understanding of poetry has become greater than the pre-war "quota." This is indicated by the skillfully composed verses, written in accord with all the requirements of this art form in our day, that fill the mail to the magazines and newspapers and even make their appearance in their pages as responses to major events embracing the entire people.

Here I do not speak of those poets whose talent is indisputable or, in any case, worthy of note. I speak of unknown thousands of composers of verse who doggedly fill their free time in the composition of what are often no doubt miserable lines incapable of significant expression.

The number of "amateur" poets is incalculable. Yet their numbers will soon be even greater. When, at the end of this Seven-Year Plan, the working people find themselves with two days off per week, it is likely that there will be a noticeable increase in the number of those who write verse.

Of course, it may well be that at that time we will see other talents appear, because the beginning painter will have additional time for sketching, the beginning actor for his activities on stage, the athlete for training in the sport that pleases him.

We have as our goal the elimination of the dichotomy between physical activities and those of the spirit. Therefore there is no need to be afraid of this sea of people who write verse. Of course, their verse is not poetry, but this striving to use the word to express one's self, one's thoughts, one's feelings, one's perceptions, albeit this expression is by no means perfect, is a striving no different from that which draws fliers to the sky, and drew the young Tsiolkovskii into the limitless distance of the cosmos, a striving for a true and more poetic dream.

How does this develop? Where does it come from? I recall something that happened in the days that the Soviet army was smashing the Mannerheim Line, destroying vast numbers of

fortified outposts surrounded by every conceivable obstacle-mine fields, barbed wire, anti-tank trenches, tank-destroyer pits. Small attack groups were organized. And while the artillery worked over the fortified outpost, while the sappers laid explosives against its wall, from which all camouflage had already been removed, the attack group, readying its grenades, lay and awaited the explosion that was the signal for it to break into the remnants of the fortification and take them.

These were counted minutes, and as they passed there was one soldier who patiently sketched out verse on paper, verse which he showed me after the battle. First, I asked him how it was that it came to him to write poetry as he lay before the walls of the fortification awaiting the signal to attack. He explained that at the sight of this fortification wall, of the smashed timbers, the destroyed scrap, at the sight of trees whose trunks had been tortured by shells, he had been seized by such excitement, by such a desire to speak of what filled his heart, that agitated by hatred for the enemy, by love for his country, and by the most immense complexity of thoughts of those near and dear to him, of his home, of his sweetheart, he felt himself compelled, with his tommy-gun gripped in his left hand, to write, with the right, lines that may not have been too skillful, but that burst with passion.

Of course, this was the inspiration of the poet but he lacked the capacity to express it with power. This same agitation is experienced by the true poet alone with the theme that inspires him. From among the soldiers of the Great Patriotic War there came many real poets, who presented in verse a remarkable expression of what they had experienced in battle and on the march. They lived the great and heroic life of the people itself. They experienced the feeling of the soldier's comradeship, witnessed the heroism of their brothers-in-arms. They fell in love at the front. They saw death and loyalty to one's duty, the sufferings of the people and the bestiality of the enemy. They carried our great triumph on their shoulders.

These poems will have a long life. And when we pick them up again, we recall memories that have receded into the background, and our dead comrades, our destroyed cities arise as though resurrected. All our thoughts of those unforgettable days return. I have noted how people react to verses written long

since that carry the great truth of poetry. In the course of the discussion on poetry, before an audience of different ages, Mikhail Svetlov read his "Grenada" and "The Italian." There were years between the writing of these poems, and decades between them and the audience. Yet what a response they called forth from the audience. As though they had been written yesterday!

\* \* \*

In the years before the Great Patriotic War, we knew poems of an earlier time, words of great inspiration, that did not arouse in us the response they did later when the fate of our government and of the Soviet people hung in the balance. Words such as *love of country, vengeance, oath, loyalty, a stand unto death, unsparing of life*, were things you encountered daily in an heroic reality, and they did not seem either rhetorical nor theatrical. They again gained new meaning, they moved the soul, they conquered the heart. These were words with which one could live, advance, win victory. Amazing! These verses "resurrected" events of the distant past, and our contemporaries understood them.

Pushkin wrote: "Poetry is the all-consuming passion of the few who are born to be poets; it embraces and absorbs all observations, all efforts, all the impressions of their lives." Today, we have a major, lofty and powerful Soviet poetry, the voice of which is heard not only within the bounds of our own country alone. This poetry embraces the voices of the poets of all the brotherly republics of our land, all the tribes and peoples inhabiting our land of Soviets.

Soviet poetry has its own great spokesman whose influence makes itself felt in any country where advanced and revolutionary poets exist. I refer to Vladimir Maiakovskii. His poems are on a triumphant march across all the continents, and the better known he becomes, the stronger his influence upon heart and mind. Maiakovskii's verses are often translated without rhythm. This weakens the verse, and yet somehow it gets across to the reader of the most distant land. There was a time when we deemed Maiakovskii to be difficult and incomprehensible because he printed his poems in his own characteristic "ladder of lines." If we will but think of it, innovations in poetry are not infrequently hard to grasp at the outset. In that connection we may re-

call the complaint of General Ermolov. Pushkin wrote of a meeting with him in "Trip to Arzrum": "The conversation touched on literature several times. Of Griboedov's verse he said that reading them made his jaws hurt."

Yet the only thing that was unique about the verses Griboedov employed in his remarkable comedy was that they varied in meter.

Today no one in our country complains that it is difficult to grasp Maiakovskii's verses. They have become our companions throughout life. During recent years we have lost a number of our poets. But verse does not die with the poet. If it is inspired with great energy, it may exist forever. This tremendous creative energy is something that every poet, regardless of age, must possess. For example, read the new verse of a lyric poet such as Aleksandr Prokof'ev. It is as fresh as the wind off Lake Ladoga; its rhythm is young and ringing; there is the imagery of a painting, the feeling of birds in spring migration, a sense of the winged, the rich. The words sparkle like gems.

And how remarkable a cycle of verse about the people of heroic Vietnam, a people that in a bloody, lengthy, exhausting war achieved its freedom, and about the people of People's China, those amazing builders of a great state, has been created by that enormously skillful master of the verse form—Pavel Antokol'skii. Glance at his new verse on time and on himself. You will be overcome by the poetic passion, and by the ringing sonority of these youthful, energetic, precise, yet flaming verses!

Yes, they differ, these two poets—Prokof'ev and Antokol'skii. And how many different voices there are today in Soviet poetry! Let that number increase. Let each of them sing in a manner so unique as to be past imitation. Remember, this difference in poetic character was a feature of Soviet poetry from the first years of its existence. Verse was being composed at the same time by men differing so greatly as Vladimir Maiakovskii, Aleksandr Blok, Valerii Briusov, Dem'ian Bednyi, and Sergei Esenin. What a variety of methods and colors—and yet they were all poets of October!

The inexhaustible richness of the world around us drives us to this variety of colors. The Soviet poet wanders over all the continents, all the highways of all the world. He sees the life of many countries, he is witness to the transformation of the

vast spaces of his homeland. He is a participant in the tremendous processes occurring in our life.

He participates in the struggle for peace. He joins in discussions with the poets of the West and the East. He is present as a guest at the "Mushaira" of India and poetry gatherings in the West, where poets talk of the future of poetry. The strength of Soviet poetry lies in the scope of its feelings and the breadth of its ideas.

Our rockets fly to the moon, and soon perhaps, man will wing into the cosmos to pioneer the road to regions not dreamed of in the boldest imaginings of the greatest dreamers. This is a matter of the not too distant future, the experts say. We believe this because we see how true to their words have been the scientists of genius of our homeland.

The man of today's world is a man not only profound in mind but broad in spirit and great in heart. Both his passions and his dreams must be reflected in art and, of course, in poetry.

Chemists and physicists are also people of our day. Some of them relax with music, and others don't even care to hear it mentioned. Some write poetry themselves, and others laugh at what is described as inspiration. It is difficult to predict what will be the predilections of the first cosmic astronaut in the field of art, and it may well be that he will have no such tastes at all . . . anything is possible!

\* \* \*

Everything changes in the world, even one's attitudes towards landscapes. In the 18th century travelers passing through Switzerland contemptuously closed the curtains of their carriages so as not to see the mountains which their road traversed. They regarded mountains as the ugliest phenomenon of nature, unbearable to the delicate souls of the lovers of the truly poetic. Time passed. And Vladimir Il'ich Lenin came to live and work in Switzerland. And when he was fatigued he chose to walk, of all places, in the mountains, in the meadows, in the looming spaces of the Alps, so as to rest there, so as to nourish himself on the fragrance of the meadows, the grandeur of the mountain peaks.

Native mountaineers such as Alim Keshokov and Kaisyn Kuliev participated in the discussion of poetry in Leningrad.

These are sons of the mountains. Are they henceforth not to gaze upon them because the world now has its TU-104s and racing cars? They write of the mountain because this is home to them. And will man in a communist society refrain from an understanding of nature and its great wonders? Who really believes this? There was a time when it appeared that it was useful and patriotic to sing only of factories and smokestacks. But this time is in the distant past.

Along with the changes in the life and the distinctive characteristics of Soviet man brought about by the realization of the new Seven-Year Plan, there will be changes in his demands upon art and poetry. A change is occurring in the spiritual life of society. Man is changing. He is developing a communist world outlook.

This tremendous creative stress will, of course, be recorded by brush and knife, verse and prose. The language of the poet will take on a new sound and a new meaning. It may be that new volumes of verse will be created right at the construction sites, that they will grow with the very walls of the new enterprise or of a vast dam, in the virgin lands being opened or in the cabins of nuclear-powered ships cutting the waves of new seas. New young poets will populate the land of their predecessors—the contemporaries of October. And new songs will be sung across the spaces of our transformed native land.

If a change occurs in the life of the spirit of a society, it is impossible that the poet's spiritual life will not also change. His outlook on the world is the sun within the soul of the poet. It illuminates the road he travels throughout life.

\* \* \*

Why was it that, in the discussion of poetry in Leningrad, every speaker made some reference, each in some different connection, to Vladimir Maiakovskii?

Because there was no way to avoid this, because it would be difficult to think of another example of so complete a poetic character with a rounded understanding of the world and of the meaning of life.

Think back on his trip to America. How long ago that was! He was not sent there as a duty, as it would be said today. No one read lectures to him on how to conduct himself in this capi-

talist country. No one outlined for him the subject matter on which he should speak. He had no need for this. Read his verse, his travel notes, and it will become clear that he entered the foreign and foggy land of the kingdom of the dollar as a plenipotentiary representative of the land of the Soviets, as a plenipotentiary representative of forward-looking Soviet poetry. What dignity, what brilliant irony, what human pride, and at the same time profound attention to everything that he witnessed, what careful study of life and what profound conclusions he drew—the conclusions of a statesman thoroughly familiar with world affairs! In that day, when no poet had yet looked into the future of this continent beyond the seas, he, Maiakovskii, summarizing his impressions, wrote: "It may be that the United States will become the last armed defender of the hopeless cause of the capitalists—in which case history will be able to write a good novel in the style of H. G. Wells' *The War of the Worlds*.

And, returning to Europe from the United States, he could not but note in his travelogue the little boys of L'Havre who dived after American pennies thrown from the decks of vessels carrying Americans to Europe: "These poor appear to me a symbol of the future of Europe if it does not cease to grovel before money, American and every other."

Behind his verses on America there stood a tremendous character in poetry, a man with a brilliant understanding of what was going on in the world, the author of *Verses on a Soviet Passport*, patriot and revolutionary, a man possessed of a communist world outlook.

When, from among the young builders of the future there will emerge new and ever-newer poets with an equally integrated view of the world, with the same purposefulness and a new poetic imagery, such men will have a complete understanding of their poetic heritage and will take for themselves that which suits them for the further bold development of Soviet poetry. And, for them, Maiakovskii will be the immortal poet of the dawn of communism.

Young poets are arising to replace their elders. This is natural law, and it would be peculiar to attempt today to devise a "schedule" for the growth of these new young poetic forces. They will come forth with new demands upon verse, with new

searches for form. These stubborn young poets—these seekers—must be given all possible aid. Obviously, this applies only to those who are truly talented. We are speaking only of these, and it is only of these with whom we are concerned.

How to help them? Maxim Gor'kii, speaking of the founding of the Institute of Literature, conceived of this as follows. He thought that the Institute of Literature should be something on the order of the ancient Greek lyceum, where a young man of talent, who had already created good work, could converse with the best representatives of all the sciences and arts about that which was most important in each branch of knowledge and creativity. This communion would enable him, through persistent creative effort and thought, to overcome his shortcomings and assist his further development. As we know, Gor'kii's "lyceum" of this exalted type was not actually realized. Our Institute of Literature today is something very, very different. But we are not discussing this peculiar institution. That is a separate question. We are speaking of young poets. And there is no law that says they must enter poetry through the doors of the Institute of Literature.

\* \* \*

It must be said frankly that we, writers of the older generation, do not always find it easy to understand the youth, and it is not always clear to us how we can best be of assistance to them. The difference in years between the young poets and the poets of the older generation has become quite considerable, and this cannot be ignored.

There was once a time when Eduard Bagritskii said to the young Communist, Nikolai Dement'ev: "Ten years difference—nothing!"

But today this difference has risen to 40 years. This is no longer to be ignored! This hit me with full force in the room in the Maiakovskii House in Leningrad which I had known for so long, during the poetry discussion to which I have referred. I saw the young faces of poets wearing short rounded beards, poets with Van Dykes, poets with tousled beards. I read their verses and understood that these are people having tastes that differ not only as to beards but as to poetry. At the same time, they all belonged to a young generation that was not entirely

comprehensible to me. If they had all spoken in the discussion, it is quite possible that, from some of them, we would have heard things that would have shocked us with their unexpectedness.

Since most of them have been writing poetry for only a short time and have only recently appeared in print, it would have been desirable to say something to them, for example, something to the effect that in the business of poetry there are certain rules without which verse cannot speak in full voice.

It seems to me that if one looks closely into the verse of, let us say, the last few years, one cannot but note that the feeling for language has weakened, the richness of the ringing word does not attract the attention of the writers, and that richness of imagery is not part of verse. One sees no serious search for new rhythms, and new strophes.

The emancipation of poetic speech was an undertaking effectuated by the persistent labors of an entire generation of poets. But this is not enough. One must move ahead. However, it seems to me that searches for the new in poetry have virtually stopped, and, I would say, unfortunately. What one must seek, to begin with, is a new expressiveness, a new plasticity in verse, new sonorities, that richness of sounds in which Lermontov so reveled:

My mind's distraught with treble harmonies,  
With limpid rhythms, as on *iu*.

(A letter in the Russian alphabet—Trans.)

Read the poems of Maiakovskii, and it is as though you had fallen upon a carnival of words. Everything thunders, glistens, stuns, appears in the multiplicity of images to which, it would appear, there are no bounds.

And the plasticity of the Russian poetic word! There is a story of Turgenev's with a scene in which a Russian reads to a German who knows neither the Russian nor the Italian language, Pushkin's poem "I Recall A Wondrous Instant" and asks him: "In what language, in your opinion, is this verse written?" And the German answers: "I would say in Italian, if one judges by the melody of the verse."

What is the youth of a poet? This is the burgeoning of his finest feelings, the boiling up of his best thoughts, desires,

dreams. He seeks something out of the ordinary, and yet the most ordinary things appear to him extraordinary. Let us say that for the poet spring is a whole new world. All the old authorities seem to have lost their significance. This world calls upon the new conqueror capable of wandering, of striding happily down new roads, of encountering a multiplicity of curious things, of experiencing adventures, of falling in love, of writing poems, of unexpectedly "discovering" an old, pre-revolutionary poet, and of finding himself seized with a desire to repeat the motifs, the themes of this forerunner. What doesn't come into the head of a young poet who finds himself in the bloom of youth?

But sometimes he cannot restrain himself from a deed, a pose, which arouses justified and sometimes rather outraged critical reproaches, because the pose expresses something that is not entirely pleasant, and the deed has not been a very lovely one. The poet persists, although actually all this is really unnecessary and without purpose.

Young people who love to attract attention to themselves by this hardly original device must not forget certain things. For example, when Maiakovskii and his friends appeared in public in yellow or red or striped women's jackets, with flowers or notes of music drawn on their cheeks, one wearing a cap, another a high hat, there would be a policeman sitting in a side seat. The local guardian of the law saw that the room was jammed to the rafters. The atmosphere reeked of impropriety. What kind of verses are these, he thought—is this really poetry they are reading? By the looks of things a fight might break out any minute. This verse howls of something, you look into it and there are even matters of politics. The whistle blows, one hears "Gentleman, this disorder must stop!" The evening has been brought to an end.

But the point is that Maiakovskii and his friends were deliberately looking for a public scandal. Their poems were, in actuality, political. And then some! Here a woman's yellow jacket came in handy, because to read lines of this kind at that time was politics in the purest sense of the word. Of course, this is not something that was evident immediately. But the police whistle! Hold on, brother! This is what Maiakovskii was reading:

My  
unarguable description of this earth  
shall be transmitted unto the final generation.  
Unhampered by meridians  
or parallels of maplines,  
the golden flood  
of francs,  
dollars,  
rubles,  
crowns  
foams and roars its triumph.  
It drowns all alike —  
genius, chickens, horses and violins.  
Drowns elephants  
and fleas.  
The plea  
"Save us!"  
sticks in nostrils  
throats  
and ears.  
From this moan  
there's no place  
to hide.

I do not think it is difficult to picture the time in which this was read, nor the times in which we live today. Today women's jackets, yellow or red, merely fool the wearer himself. And nothing more.

There is something else to be noted. A young poet may suddenly find himself with an extraordinary feeling of loneliness. And, pursuing his variation on this romantic state, the poet begins to lead the life of a chaser of passions. He changes his feelings like gloves, and begins to look like the provincial rake, echoing rather banal doggerel of the past. His time and powers go to waste.

The stormy youth of some talented poets brings them to paths in life, moods, words not worthy of them, and guides them away from the real, the expansive, the loud-ringing actuality of the day, blinds them and turns their head with the blandishments of easy triumphs. Today, there is no need for a poet to

wear a distinguishing kind of clothing so as to attract attention, those times have passed and people do not live by these standards today. But it is possible for a young and talented poet of our day to permit his best years to slip by in dark caprice and foggy moods, and then he will still have to look back to the years that have passed and say to himself, in verse or in prose, that this was time gone to waste.

There was a case of a very important Russian poet who after this period had been irretrievably lost, wrote with the full sincerity of which he was capable:

I envy those  
Whose lives have passed in struggle  
Who defended the greatest of ideas.  
But I, whose youth was wasted  
Have not even memories for consolation.  
    What stupid waste!  
    What insupportable regret!  
    It was I who parked me on a siding,  
    For it was within me to give  
    more than I did,  
    other than I played at for a game.  
I know now that bitterness cannot in wine be drowned  
That souls do not heal  
in deserts and behind walls alone.  
Know, how I too, if 'twere not too late  
Would spit on my hands  
And run to build with the Komsomol.

This was a great drama in the life of a great Russian poet. And this was written in 1924, but this is 1960!

I remember the alarm of the older poets, the older masters of Russian verse such as Nikolai Aseev and Pavel Antokol'skii, to the effect that high art must not disappear to be replaced by skillful, uniform, smooth verse with all the earmarks of a skilled trade, ready to fulfill customers' orders on any desired theme. Verse of this kind does get printed, but it dies quickly, unnoticed, although it may bring its author some degree of success.

What we need to do is to distinguish among the young poets and not treat them all in stereotyped fashion. It would be unjust to cross some young man off the list just because some

of his verse is imperfect, if he is a talented individual and shows promise.

Beginning poets who work, yes, and I mean on their lines, and do not hurry to editorial offices with verse hastily written, must remember—no, to remember is not enough—must feel with all their being, that the most important trend in their poetry is the time in which they live, and the people of this contemporary world, the heroic creators of the future, the new people on a free land won by tremendous sacrifices and by an enormous outpouring of blood. This must not be forgotten.

## The Nature of Work in the Future Communist Society

By L. N. Kogan

Soviet writings recently have been paying increased attention to the communist society of the future. This article, from a Soviet philosophy journal, examines the following questions, among others: Will physical labor disappear under communism? What changes in occupational specialization can be expected? What kinds of incentives will prevail? What will happen to work attitudes? ["From Socialist to Communist Labor," *Voprosy Filosofii*, 1960, No. 2—abridged.]

One of the most important prerequisites for the transition to communist labor in the narrow and strict sense of the word is the comprehensive automation of production processes.

Automation and rapid technical progress lead to significant social consequences. *First*, labor is immeasurably lightened and made healthier.

It is very important to stress, however, that the disappearance of arduous, unmechanized jobs in the process of the comprehensive building of a communist society will not at all mean that physical labor as such will disappear. In our literature the line between "unmechanized labor" and "physical labor" is not always clearly drawn.

Physical labor will exist under communism, too, although unmechanized, exhausting labor will disappear in the process of comprehensive automation. Even the very best automatic line presupposes the use of some physical labor, as for instance, in the adjustment and repair of the line, but excludes arduous, unmechanized work. Physical labor may be very highly mechanized and yet remain physical labor. The view that the tre-

mendous progress of technology, the development of automatic machinery and telemechanics, all-round electrification, the increasing application of chemistry, and the gasification of production will result in man doing nothing at all with his hands, in physical labor completely disappearing, is incorrect and harmful to the education of the young generation. These tales have caused a small section of our youth to develop a supercilious, scornful attitude towards physical labor, as well as sybaritism and an idleness alien to Soviet society.

Communism does not at all reduce all labor to "brain work." The joyous, creative work of man under communism should not be regarded as mere amusement, childplay, a pastime, as the well-known French utopian Socialist Charles Fourier conceived it. Criticizing this view, Karl Marx in one of his preparatory manuscripts for *Capital* observed that under communism, too, labor will be "a devilishly serious business, a most intensive strain." Without using one's hands it will be impossible, even under communism, to adjust or repair a machine, to supply an automatic machine with a program, to paint a picture or hew a bas-relief from marble. Physical labor, while existing under communism, will be a qualitatively new type of labor. It will merge in all of its processes with mental labor, with creative effort, with science, and it will be mechanized so as not to require any exhausting physical strain.

Speaking of the lightening of labor resulting from automation, this lightening should not be interpreted in a one-sided manner. The new technology of communism, while relieving the worker of exhausting muscular strain, of monotonous, tiresome repetition of the same set of movements, at the same time places much greater demands upon the worker. He must not only be familiar with the intricacies of the automatic devices but be able to adjust them, to combine the functions of operator with those of fitter-repairman. Naturally, it is more difficult to master this technology, to squeeze every possible ounce of efficiency out of it, than to master the simplest, the most primitive devices.

The new, modern technology, while lightening the worker's labor (in that it rids him of arduous muscular effort), at the same time renders it more intricate. This dialectical contradiction must not be overlooked by us when speaking of the transition to communist labor. Hence, the notion that labor under

communism will be a "pastime," "childplay," etc., is immobilizing and harmful.

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*Second*, in the process of implementing comprehensive mechanization and automation, higher standards of cultural and technical training will be necessary. Highly skilled people of great intelligence will be required in every field of social labor. This is confirmed by the experience already acquired in the process of automating the country's factories.

*Third*, it is therefore no accident that the introduction of new, modern technology leads to substantial changes in the social division of labor. Communism abolishes the essential difference between physical and mental work. Physical and mental work will be harmoniously blended in every production process. Physical labor itself will be pervaded, as it were, by mental labor processes.

However, some differences between physical and mental labor will, we think, continue to exist under communism, too. These spheres will be distinguished both by the quantitative predominance of mechanized physical or mental labor, and by the purpose of labor, by its end result—the creation of material or spiritual values.

What should be particularly underscored is that under communism not only physical but mental work, too, will undergo a qualitative change. Our literature does not always stress this fact. The tiresome mechanical computation work which consumes so much of the time and effort of engineering personnel will be drastically reduced and subsequently eliminated altogether. These operations will be performed by electronic computers. Automatic devices will also greatly ease all reference work and other auxiliary mental operations which do not involve truly creative endeavor. Clearly, extensive automation of many mental work operations will require much additional knowledge and skill from these workers. This is the way in which we conceive of mental and physical labor being brought closer together while at the same time each retains certain distinctions. Of course, the essential differences between them will not disappear without these qualitative changes in the character of physical and mental labor. That is why their elimination must not be reduced

to a mere rise in the cultural and technical level of the majority of the workers and collective farmers. It is precisely this change of character of both physical and mental labor that will lead to a change in the social structure of society and cause the disappearance of the special social stratum, the intelligentsia.

Automation alters not only the interrelationship and interaction between people involved in physical and mental work, but also the occupational specialization of people in production.

There can be no doubt that as society advances towards communism a number of existing specialities will vanish while others will emerge.

While in 1925 there was not a single combine operator, conveyor operator, or electric locomotive operator in coal mining, in 1954 there were 2,700, 17,900 and 17,900 of them respectively. The number of adjusters and fitters of machine-tools and automatic devices increased from 1,200 in 1925 to 53,000 in 1954 (see *Forty Years of Soviet Power in Facts and Figures*, Moscow, 1958, pp. 231-232).

In the course of technical progress specialization will undergo constant change. Some of the workers will naturally be transferred to narrower operations, but under socialism this process by no means signifies conversion of the worker into a "partial worker." As the June (1959) Plenary Meeting of the CC CPSU pointed out, automation necessarily implies that workers will have more than one trade. At the factories now controlled by the Sverdlovsk Economic Council, additional trades were learned by 4,062 workers in 1951, 14,261 in 1958, and 10,097 during the first half of 1959 alone. More than half the workers of the Uralmash plant forge and press department and about two-thirds of the workers of the Uralvagon plant steel smelting department at present have mastered two or more trades.

It is very important to point out that in our enterprises there has been a steady growth in the number of leading workers who combine production functions with teaching work as instructors at advanced methods schools, multi-trade schools, training courses of various kinds, etc. In 1958, upwards of 2,500 workers in the Sverdlovsk economic area were enlisted to act as vocational training instructors. Such a combination of occupations is particularly indicative and important for it represents a combination of both physical and mental work.

Participating in this activity, the worker not only imparts his own advanced knowledge to his comrades but he also studies himself: in preparing for his lessons he reads up on new technical literature, studies the experience of workers of other factories, etc.

The learning of two or more related professions should not be regarded as renunciation of specialization. Until quite recently the view prevailed that communism will mean the complete abolition of specialties. This is an erroneous view. While agricultural labor will become a form of industrial labor, certain minor distinctions between work in town and country, just as between physical and mental work, will undoubtedly continue to exist.

Under modern conditions of engineering and science no one will simultaneously be able to be a qualified specialist in several branches of the economy. However, under communism there will really be full freedom of choice of a profession and an opportunity to intensively specialize in a number of closely related fields. Hence, Engels' statement that under communism there will not be any people slavishly attached for life to one profession is quite true. But specialization will exist under communism too. However, any profession will present full scope for the development of the abilities of any individual.

Speaking of work according to one's abilities, we have in mind not only the physiological inclinations of an individual but a definite cultural and technical level enabling the individual to skillfully perform this or that job. A man must work according to his abilities both under socialism and communism, but under communism people's abilities will develop to such an extent that a fully rounded and educated person will be able to freely choose a profession, unhampered by limitations due to an insufficient high cultural and technical level.

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*Fourth* and last, under communism, thanks to the automation of production, the cultural and technical growth of the workers, the more extensive application of science, better organization of labor and higher development of the creative initiative of the workers, labor productivity will increase substantially, and this will be attended by an increase of leisure

time for the workers. It is precisely the growth of labor productivity which makes it possible under socialist conditions to reduce the working day and working week while constantly raising wages.

The reduced working day gives the workers more free time, promotes the many-sided development of the individuality of each worker, raises their cultural and technical level, and thereby increases their labor productivity.

Only under socialism can we speak of free time as "scope for the development of talents" (Karl Marx). Only here does the process of work itself and free time promote the many-sided development of the individual, and no antagonism exists, or can exist, between work time and free time: both promote the many-sided development of man. Free time is by no means time for idling. In his leisure hours the advanced Soviet worker rests, studies, takes up the arts, sports, etc. Proper use of free time, by helping to develop the individual in all directions, becomes a powerful stimulus to production and higher labor productivity.

For an understanding of the process of transition to communist labor, it is important not only to study technical progress as such but to analyze the effect which technical progress has on the formation of a new type of worker, to analyze the social consequences of technical progress.

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At this point, special attention must be devoted to the development of socialist production relations in the field of distribution.

The proceedings of the 21st CPSU Congress point out that even now in certain areas of our society there are some elements of the communist principle of free distribution of material and spiritual wealth. As we advance further towards communism the sphere of operation of this principle will steadily expand. In 1965, the value of freely distributed goods and services will average 3,800 rubles per worker. Clearly, these grants and privileges are distributed out of the labor contributed by the worker to society. That is why a citizen of a socialist society has a material interest not only in working for himself but in working for society too. The gradual merging of personal and social ma-

terial interests represents a characteristic trend of our development.

With the transition to communist labor and the gradual expansion of the sphere of operation of the communist principle of distribution, the worker's interest in increasing that portion of his labor which is placed directly at the disposal of society will grow. Labor under both socialism and communism is a source of the means of subsistence for the whole of society. But under socialism the inequality in the value of the labor of different people results in their receiving differing amounts of material wealth for their personal use (although even now some material and spiritual benefits are distributed free and equally among all). Until we achieve a communist abundance of material wealth this principle of socialist distribution according to work will prevail.

The basic socialist slogan, "He who does not work, neither shall he eat," has been proclaimed and is being steadfastly pursued in our society. Education through work, stresses the CC CPSU resolution "On the Tasks of Party Propaganda Under Present-Day Conditions," is the principal direction of ideological work, and it has fully vindicated itself in practice. In the course of the struggle for establishing the material and technical basis for communism, for an abundance of material and cultural goods, the moral stimuli to labor grow and become more firmly entrenched. The expansion of the sphere of operation of the communist principles of distribution of material and spiritual benefits also makes for constant growth of the moral labor stimuli.

The moral labor stimuli essentially constitute an understanding of the social role of one's labor, comprehension of the purpose of labor, which is to provide the maximum amount of output in order to strengthen the might of our homeland and bring nearer the victory of communism. Among the moral stimuli we may also include such measures as personal distinctions for front-rank workers (bestowing orders, medals, certificates, honorary titles; having one's name posted on the board of honor, etc.). It goes without saying that personal moral incentives are not the most important elements in the system of moral stimuli to work but hold a secondary place in relation to the basic social purpose of labor.

It was moral stimuli, a high sense of civic duty, which inspired the hundreds of thousands of Komsomol members who left the big cities to cultivate the virgin lands of the remote regions of Siberia and the East. A vivid example of Soviet patriotism was shown by the Komsomol member V. Bashmachnikov, a Ural University student, who on graduating from the history department voluntarily went to work, in the capacity of planning economist, at one of the backward collective farms of Sverdlovsk Region to help advance the economy of the farm. Moral labor stimuli play an ever-growing role in the life of our society. This is corroborated by the remarkable movement initiated by Valentina Gaganova, who voluntarily, without a suggestion from anyone, transferred from a front-rank team to a backward one in order to pull it up to the front. Gaganova was fully aware that this would mean a temporary sacrifice of wages. Today the team headed by Hero of Socialist Labor V. Gaganova has already achieved the title of a Communist Labor Team.

The communist consciousness of the front-rank Soviet workers manifests itself also in their readiness to do volunteer work for society without pay. Thus, A. M. Chugunov, formerly an ordinary worker and presently assistant chief of the tool department of the Uralmash plant, takes up a place at the machine whenever some difficulty arises in the gauge section and sets an example of high efficiency to the younger men. And although he contributes his free time to this work, he refuses to accept any pay for it.

Thus, material incentives under socialism are necessarily combined with social labor stimuli. Work under socialism is the duty of every Soviet citizen. However, the very conception of "work as a duty" has changed under socialism. This was aptly expressed by the eminent Soviet educator and writer A. S. Makarenko: "In our country the duty to work has ceased to be a negative phase of life. Our duty is no longer the former cold category of man's duty. With us it is first of all a program of growth and development of the personality firmly linked with happy prospects of life" (*Pedagogicheskie Sochineniya*, 1948, p. 273).

The attitude towards work depends upon objective factors. It is determined by the position and character of labor in society. At the same time the attitude towards work is connected with

a number of subjective factors, particularly the degree of the workers' consciousness.

The attitude towards work is one of the main indicators of the cultural and technical level achieved by the workers, an inseparable part of it. During the period of comprehensive construction of communism it is the steady growth of moral labor stimuli that will serve as an indication of the gradual transformation of work in the eyes of all members of society into a prime necessity.

The high moral labor stimuli developed by the Soviet people are manifested in the public opinion created in the factories against violators of socialist labor discipline. Thereby, people's moral standards take over certain functions of law. Public condemnation of violators of labor discipline often proves more effective than administrative measures. Treating labor as a matter of honor and social duty, the conscious workers of town and village take into their own hands the struggle against the survivals of capitalism in the attitude towards work. Therein one of the visible features of labor's transformation into a prime necessity also manifests itself.

## Free Time Under Communism

By N. P. Kostin

With the reduction of the working day increasing attention has been focused on the use of leisure time. This article points to the major activities which will occupy people's free time in the communist society of the future. ["Free Time Under Communism—Answers to Questions," *Voprosy Filosofii*, 1960, No. 5—abridged.]

Sometimes we come across mistaken conceptions about the living conditions, work activity, and types of occupations which will prevail under communism. In particular, there are some who hold the view that people will be chiefly occupied with entertainments and amusements under communism, that these are the activities which will absorb almost all of the people's free time.

Is this what will really happen? Let us briefly try to deal with this question.

The reduction of the working day is one of the programmatic principles of Marxism-Leninism. Marx, Engels and Lenin all discussed the necessity of reducing the working day with the development of a communist society. As we know, the length of the working day under capitalism depends on the relationship of forces in the struggle between the working class and the capitalists. At the start of the industrial revolution, that is, at the end of the 18th century, the working day in capitalist countries reached 16 to 18 hours per shift. Even children were forced to work for 12 to 14 hours. But the organized action of the workers forced the bourgeois governments to place legal limits on the length of the working day.

The capitalists have always opposed, and continue to oppose, any attempt to reduce the working day, first of all because its

reduction would hurt their profits, and second, because it would release time and energy which the workers could use to achieve their class aims.

Under socialism the question of the working day must be posed in a completely different manner. There are no capitalists here. The socialist state is interested in lightening the labor of the workers, in creating the conditions necessary for their physical and spiritual development. Thus, it is also interested in reducing the working day.

One of the first decrees of the Soviet Government established the 8-hour working day. The country's achievements in the sphere of economic development and the rising productivity of labor made it possible for us to switch to the 7-hour working day and the 6-day working week on the eve of the Second World War. It was only the threat of war hanging over our country which forced us to return to the 8-hour day and the 7-day working week.

However, the Communist Party of the Soviet Union has always looked ahead to the reduction of the working day. The Seven-Year Plan offers convincing testimony to this effect. In 1960 we will complete the transfer of workers and employees to a 7-hour working day, while workers in the leading occupations in the coal and ore-mining industries employed in underground work will be shifted to a 6-hour working day. In 1962 workers and employees on a 7-hour working day will be transferred to a 40-hour working week.

Beginning in 1964 workers and employees will be shifted to a 35-hour working week, while workers employed in underground jobs and under dangerous working conditions will be shifted to a 30-hour working week. This means that with one day off each week the length of the working day will be either 5 or 6 hours, depending on the nature of the work. Or, it will be possible to introduce a 5-day working week with a 6 or 7-hour working day and two days off each week.

In this connection, the Seven-Year Plan provides that the transfer to the shorter working day will be carried out without reducing wages. Not only this, but the wages of workers and employees will steadily increase.

All this indicates that at the end of the Seven-Year Plan the Soviet Union will have the shortest working day and the

shortest working week in the world. But the current Seven-Year Plan is only one of the stages in our movement towards communism. The fulfillment of our Fifteen-Year Program will make it possible for our government to reduce the working day still further, and in the subsequent years society will find new possibilities for continuing this policy.

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What guides our government in determining the timing and the extent of reductions in the working day? Is the timing of the transition to the 7-hour working day and the 40-hour working week in the Seven-Year Plan arbitrarily determined? Is the date for initiating the gradual transfer to the 30 and 35-hour working week, i.e., 1964, arbitrarily determined? Of course not. We must remember that the reduction of the working day is subject to certain laws. Our government cannot reduce the working day now to, let us say, 4 hours. A reduction of this magnitude would substantially diminish the quantity of output of our enterprises, and this in turn would reduce our economic potential and the standard of living of our population. It is obvious that such a reduction of the working day under present circumstances would conflict with the basic goal of the socialist society, with a steady increase in the material and cultural well-being of the people. This means that the government cannot arbitrarily reduce the working day. It must base its policy on objective factors, factors that operate independently of the will and the desires of people, and in accordance with these factors it must answer the following question: Over what period of time and by how much can the working day be reduced? It is clear that the reduction of the working day must be carried out in such a way as not to retard the growth of social production. Moreover, production must continue to grow even while the working day is being reduced so as to meet the growing requirements of our people.

Will this be possible? Yes, it will be. This expansion of production will be achieved primarily through a growth in labor productivity stemming from the introduction of new technique and technology, new scientific discoveries, improved organization of labor and a rise in workers' skills. This means that the reduction of the working day depends entirely on the level of develop-

ment of the productive forces, on the rate of growth of labor productivity and of social production as a whole.

Thus, there is a direct connection and dependence between the level of development of the productive forces and the amount of free time available. That is why in the communist society the level of development of the productive forces will be judged according to the amount of free time available. "The criterion of wealth will then be not labor time, but free time," said Marx ("Unpublished Manuscripts of Karl Marx," in the journal *Bolshevik*, 1939, No. 11-12, p. 64).

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How, then, will free time be utilized under communism? What influence will it have on people and on production? It is impossible, of course, to give an exhaustive answer to this question. Life is always more complex than any theoretical reasoning. This is particularly the case these days as we witness rapid developments in technology and social change. Thus, our judgments concerning the conditions of life under communism are of a provisional nature.

However, relying on Marxist-Leninist theory which has defined the major features of production and production relationships under communism, we may offer some opinions on what the conditions of life will be like under communism. Our concern here is to present some idea of how free time will be utilized under communism.

As we know, the goal of communism is to ensure the many-sided development of the human personality. The reduction of the working day lightens labor, releases a great quantity of mental and physical energy in people, and thus creates the prerequisites for the flowering of the personality.

In this connection we should note another very important aspect of this question: the reduction of the working day does not in itself necessarily lighten labor, does not always economize on the mental and physical energy of people. For example, in some capitalist countries legislation provides for an 8-hour working day. But the craving for profit has driven employers to find indirect means of forcing workers to expend more of their strength without prolonging the working day. With this end in view capitalists have heightened the intensity of labor.

Under any conditions, of course, labor must have a certain reasonable intensity. But the human organism has its physical limits. Man has a limited amount of strength and energy, he becomes fatigued in the process of labor and requires rest in order to restore the strength he has expended. The capitalists do not reckon with this peculiarity of the human organism. They know that a person who has lost his strength can be replaced by new workers, particularly from among the unemployed, who can be forced to work under any conditions. Thus, capitalists pursue a policy of unrestrained intensification of labor leading to the complete exhaustion of the strength of the individual. The worker is forced to expend as much strength and energy in 8 hours as he would expend in 12 to 14 hours under normal conditions, that is, with a normal intensity of labor. It is this extreme intensification of labor which results in the fact that by the time they reach 40 many workers at capitalist enterprises completely lose their capacity to work and are thrown out of the production process.

This phenomenon does not exist under socialism. A socialist society really strives for the maximum possible easing of labor, for an economical expenditure of the strength and energy of the human being. In particular, the reduction of the working day helps to achieve this.

The reduction of the working day will release a tremendous amount of strength and energy in human beings. And people will use this regained strength first of all to improve their knowledge in the most diverse fields. They will study the sciences, production, they will be busy inventing, rationalizing. There can be no doubt on this score, and here is why.

So long as mankind exists, people will develop and improve production, for it is only in this way that they will be able to exist, to perpetuate their stock, to raise their standard of living.

In this connection we must remember that people's needs for material and spiritual goods are constantly growing. This means that the production of these goods must constantly grow, must be raised to an ever higher level. The acquisition of knowledge and experience will help people to perfect production.

Problems of the productivity and the easing of labor, of perfecting its organization, will occupy the center of attention of the communist society. As we know, when communism becomes

a single, all-inclusive system there will be no state and no organs of compulsion. However, it would be incorrect to assume that society will have no need for the organized utilization of labor. At the 21st Congress of the CPSU N. S. Khrushchev noted: "Some people crudely conceive of a communist society as a formless and unorganized, anarchic mass of people. No, this will be a society of highly organized and well-coordinated collaboration of people of labor. In order to direct machinery, everyone will have to fulfill his work functions and community responsibilities at definite times and through established procedures."

The planning of production will not only be retained under communism but it will be even more efficient and all-inclusive.

In order to carry on normal production activity, a definite quantity of labor will always be required. Based on the requirements of production, society will determine the working time and place of each worker. In doing so, each worker's abilities and desires will be taken into account, of course, but we must not forget that under communism each worker will value the public interest above all, even when the latter may not coincide with his own desires.

The labor of the members of the communist society will be creative, and this means it will be highly productive. It will be natural for people to work according to their abilities, without compulsion, and people's abilities under communism will be incomparably higher than they are now.

Under communism the nature of work will be fundamentally changed. Work will become free, man will have the opportunity of working for himself and for society as a whole. Parasitic classes will be eliminated, workers will have a feeling of pride in their work, in their contribution to the community. Society will take effective measures to ease labor, to create for each worker the most pleasant conditions possible on his job. The gradual elimination of heavy physical labor and the reduction of working time will lead to the complete disappearance of hostility towards work. Work will offer joy and satisfaction.

A considerable portion of free time will be devoted to the acquisition of knowledge, the study of production, invention, rationalization. Free time will be a powerful factor making for the growth of labor productivity, for the expansion and improvement of communist production.

People will devote part of their time to fulfilling their community responsibilities. Under communism, all aspects of society's activities will be directed by public organizations. In order to handle this gigantic task, all members of society will have to be drawn into the government of society.

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However, free time under communism will be used not only to study production, technique, technology, theoretical and applied sciences, and in the administration of social affairs. It will also be spent in artistic, literary, and sports activities.

Lenin noted that one can become a communist only by striving to assimilate the sum total of knowledge accumulated by mankind.

The problem of mastering the heights of human culture is of great significance even today. A tremendous interest may be observed among the working people of our country, particularly the youth, in amateur groups, the theater, the cinema. Universities of Culture are springing up in the remotest corners of the country. The fact that the Soviet Union has substantially exceeded all other countries in the publication of literary works is evidence of the love for literature among our people. In 1959 the number of books published reached astronomical proportions, substantially exceeding a billion copies. Our radio and television extensively popularize classical music, new theatrical presentations, the performances of amateur groups.

It may be said without exaggeration that Soviet culture and art are the direct heirs and successors of the finest traditions of mankind in these areas of social life.

The most diverse kinds of sports activities will be greatly expanded under communism. We know that physical activity is absolutely necessary for the human organism. Without gymnastics, without sports, there can be no normal physical development of people. Sports will provide the necessary physical development for the organism and thus ensure its normal growth. There will be a particularly great expansion of tourism, for this is simultaneously sport and rest, and provides great opportunities for discovering and observing things, and fortifying one's strength. Thus, in the future, every healthy person will be a tourist to some extent.

But it would be a mistake to think that the study of production, the sciences, literature, art, sports activities and fulfillment of community obligations will occupy all of the free time available. People will have sufficient time for amusements.

Free time under communism will be utilized extremely effectively; it will give every person the opportunity to develop his abilities in every possible direction.

The absorption of additional knowledge and experience, the study of art, and involvement in sports and in healthy leisure will have a beneficial effect on all members of the communist society, raising their creative opportunities, their working capacities and their energy.

"Free time," wrote Marx, "including both leisure time and the time spent on loftier activities, transforms those who have it into different people, and it is as different people that they enter the production process" ("Unpublished Manuscripts of Karl Marx," in the journal *Bolshevik*, 1939, No. 11-12, p. 65).

The problem of utilizing free time has even now become one of our major practical problems. It is inseparable from the educational work being conducted by the Party, the trade unions and the Komsomol. The working people, and particularly the growing generation, must be shown the correct and most rational way of utilizing free time. And they must not only be shown this, but the opportunities for utilizing free time in this manner must be made available. The community must be increasingly concerned with organizing the leisure of the working people and the youth. Where this matter is allowed to drift, all sorts of unpleasantries may arise. We must not forget about the tenacity of the survivals of capitalism, about the penetration of corrupting ideology among some channels in our midst.

The overwhelming majority of our youth are working selflessly and know how to make good use of their free time. Millions of our young people are studying in evening and correspondence schools, millions are involved in amateur groups. In large and small cities, in collective and state farms, the youth are engaged in sports, in the work of the most diverse kinds of circles—literary, technical, handicrafts. If a person has the desire, he can always find a pleasant and, at the same time, a useful activity.

Unfortunately, however, one finds other examples. There are a small number of young people who have too much free

time (and are still not engaged in socially useful labor) and who use this time improperly. The whole purpose of their lives is often reduced to dancing, visiting restaurants, and engaging in drinking bouts. And from here, delinquency is only one step away. This, of course, is only a mold on the surface of our joyous and healthy society, but it is an annoying mold and indicates that we have not yet done everything required in the area of upbringing. Our movement forward to communism requires that we instill high moral qualities in all Soviet people without exception. This is why the rational utilization of free time and the organization of leisure are serious matters which must be at the center of attention of the whole Soviet community.

## A Soviet View of Einstein

By I. E. Tamm

I. E. Tamm is a Nobel Prize winner and physicist whose appraisal of Einstein's work is in contrast with the critical estimates of Einstein which appeared in Soviet publications in earlier years. ["Albert Einstein and Modern Physics," *Kul'tura i Zhizn'*, 1960, No. 5.]

Five years have passed since the death of Albert Einstein, of whom Lenin spoke as one of the great transformers of natural science.

To call Einstein the greatest physicist of the 20th century would be an obvious understatement. He may justly be compared only to Newton. Newton and Einstein represent pinnacles of human attainment in the study of nature, the peaks of the 300-year period of the development of the exact sciences, spanning an enormous area in their common achievements. It is also possible, I believe, to compare Einstein and Newton in the sense that Newton laid the foundation of modern natural science, while Einstein's creation—the theory of relativity—crowned the edifice of classical physics.

It must be said that classical physics is frequently understood as pre-relativity and pre-quantum physics. Notwithstanding the truly profound transformation wrought in physics by the theory of relativity, it would appear to me more correct to regard classical physics as the physics of the macrocosm (including the theory of relativity) as distinct from the quantum physics of the microcosm.

It will be well to recall that physicists include in the macrocosm phenomena that occur on the ordinary, everyday scale (millimeters and kilometers) and in the microcosm—phenomena

invisible to man, phenomena that are atomic and subatomic, i.e., on a scale considerably less than the size of atoms.

There can be no doubt that the mode of thought of relativity theory is the mode of thought of classical physics and that the theory of relativity imparted to classical physics the necessary consistency, harmony and completeness. What is more, the theory of relativity was of tremendous importance for the subsequent stage of the development of physics.

Back in the second half of the last century, Maxwell and Boltzmann established a concept of statistical physics which led, in our own time, to the creation of quantum mechanics. The principles of this physics of the microcosm differ radically from those of the physics of the macrocosm. The idea of the probability of a given event and the notion of statistical regularity serve as the points of departure of quantum physics, whereas in classical physics it was thought that these concepts were required because of the incompleteness of human knowledge and that, underlying all physical phenomena—including those on the atomic scale—were not statistical laws, but unique, so-called dynamic, regularities. Einstein contributed to the building of quantum mechanics not only by the fact that in the same memorable year of 1905 in which he laid the foundations of the theory of relativity, he was first to advance a radically new hypothesis of light quanta (for which he was awarded the 1921 Nobel Prize in physics). It may be that Einstein did more for the creation of quantum physics than any one of its immediate creators because the theory of relativity itself blazed the trail for new and fundamental transformations in physics.

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For dialectical materialists it has always been clear in principle that, on the one hand, human ideas and concepts are not given *a priori* but are a generalization of human experience; that, on the other hand, nature is inexhaustible and, therefore, our conceptions and ideas are limited. For this reason, each time we penetrate into a sphere of new and unexplored phenomena it becomes necessary to modify and generalize our basic scientific concepts and views so as to be able, with their aid, to embrace the new sphere of phenomena. Nevertheless, at the end of the last century physicists were enveloped in a certain com-

placency and self-confidence; the dominant view was that the fundamental laws of physics had been discovered and that there remained only refinements—essential though they might be, but still within the framework of firmly established principles. Even such an outstanding physicist as Sir William Thomson (Lord Kelvin) expressed this view in a speech made at the turn of the century. True, he did qualify his statement by saying that there were still two clouds on the otherwise clear quiescent firmament of physics: one, connected with Michelson's experiment, the other—with the so-called ultra-violet catastrophe which arises when considering thermal equilibrium between matter and radiation. Subsequently, the first "cloud" gave birth to the theory of relativity, and the second, to quantum theory, the two cornerstones of the physics of the 20th century.

The creation of the theory of relativity destroyed the very roots of that erroneous scientific frame of mind and established the understanding that each new stage in the development of physics inevitably demands a radical revision, renovation and extension of its most fundamental principles and concepts, such as, for example, those of space and time.

This new frame of thought also opened the way for quantum physics. And, doubtlessly, it will again play a decisive role in resolving the fundamental problems apparent in the theory of elementary particles and of super-high-energy processes. I am convinced that the solution of these problems will raise physics to a new level in the very near future. There can be no doubt that this new frame of thought will greatly influence the development of the other natural sciences as well.

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Yet another aspect of this matter must be stressed. The development of the theory of relativity not only produced a revolutionizing effect on the whole of physics; it emphasized the continuity in the development of science. The theory of relativity was a particularly brilliant illustration of the fact that each new stage in scientific development does not cancel out or reject the preceding stage, but includes it as a special case of a more general law and establishes its limitations. In this sense classical mechanics is a particular case of relativistic mechanics for velocities that are small in comparison with that of light.

The generally accepted, though perhaps not so fitting, terminology distinguishes between the special and general theories of relativity. Crudely speaking, the special theory of relativity is a theory of phenomena in which bodies or particles move with velocities close to that of light (300,000 kilometers per second). The general theory of relativity is a geometrical theory of gravitation that reduces the forces of Newtonian attraction between bodies to the curvature of space in the vicinity of the bodies, the curvature being due to the bodies themselves.

The special theory has reached such a degree of perfection that at present it is not so much a question of developing it further as of applying it to various physical phenomena. The validity of the special theory of relativity cannot be doubted. It has been confirmed not only by experiments conducted to verify it, but—and this is more important—by agreement with the totality of the consequences of present-day theory in physics, of which it is one of the most important principles. What is more, the special theory of relativity has become a part of today's technology and serves as the foundation for the designing of particle accelerators and also for many highly important technical calculations associated with the use of atomic energy.

This theory has not only radically altered our views on space and time, but has also laid bare the gapping logical inconsistency of earlier notions. Let us take an example. It was thought that the concept of the simultaneity of two spatially separated events has a very definite, unique meaning, or, in the parlance of physics, an absolute meaning. It was thought, for instance, that such a meaning could be attached, say, to the following assertion: "An aircraft took off from Novosibirsk at 12 o'clock, Moscow time" (that is, when the Moscow clock indicated 12). In this case, it was implicitly assumed in classical physics that the simultaneity of spatially separated events could be established by means of signals propagated *instantaneously* over any distance. But since nature knows of no such signals, the notion of absolute simultaneity is, in actuality, meaningless; simultaneity has only a relative meaning.

In reality, we check clocks in different cities by means of radio signals, which are not propagated instantaneously but with the maximum possible velocity, that of light. A check of this sort carried out by a radio station situated on the earth's surface and

by another one on, say, a sufficiently fast-moving rocket will lead to differing results, and—in principle—neither result can be preferred since they are equally valid.

This is closely bound up with the widely discussed popular science "paradox"—an astronaut flying in space at sufficiently high speed returns to earth younger than his terrestrial twin. This is a prediction of the special theory of relativity, and like all its predictions, has been confirmed by experiment; true, it has not yet involved man, but only peculiar elementary particles called mesons.

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Einstein's whole scientific life conspicuously demonstrates that fundamental progress in the cognition of nature is achieved by a profound logical analysis of a small number of key experimental facts and laws which one has to know how to distinguish from among the colossal amount of data and facts that overwhelm every branch of modern science.

Especially characteristic in this respect is the way in which the general theory of relativity was originally conceived. Einstein was led to this theory through the analysis of an extremely simple fact: the ratio of the inertial mass of a body to its ponderable mass is the same for all bodies. The principle of the equivalence of acceleration and a gravitational field—the underlying principle of the general theory of relativity—is essentially a direct generalization of this fact, which had long since been known.

It will be recalled that the general theory of relativity includes a rational theory of gravitation. This gravitational theory is related to the Newtonian theory of gravitation in the same way as present-day electrodynamics is related to the theory of electricity based solely on Coulomb's law of the interaction of charges. Indeed, in classical theory gravitational forces between bodies were considered independent of the velocities of these bodies, and only the theory of relativity established a definite relationship between them and determined its character. At the same time, the general theory of relativity resolved the problem that Lobachevskii had sought to solve by measuring the sum of the angles of a large triangle. It demonstrated that actual physical space was not Euclidean, but possessed curvature. Within the

limits of our terrestrial experience we do not notice this curvature of three-dimensional space (and also four-dimensional, when time is included), just as the earth's spherical nature is not perceived in short walks over its surface.

Finally, having solved the problems of the geometry of the usual human scale and of "small" astronomical scales (I have in mind the solar system of our galaxy), the theory of relativity established the theoretical basis for investigating the geometry of the "large" astronomical scale—the cosmological scale. Now, with modern telescopes penetrating thousands of millions of light years into the depths of the Universe, problems of cosmology are open to experimental investigation, and we may be sure that Einstein's theory of relativity will be a reliable guiding star in man's penetration into this new unexplored world, just as classical physics, atomic physics and the electron theory played a leading role in explorations into the microcosm. And just as studies of the microcosm led to a new stage in physics—quantum theory—which, to everyone's surprise, altered fundamental concepts in physics, future cosmology may also prove to be something quite different from what we regard it today.

No one, of course, can predict the future development of physics, but I think one point is beyond any doubt: Einstein's ideas, his analysis of the concepts of space and time and of the interconnection between space-time relations and matter (existing in space and time) may, in the future, undergo profound changes, but most certainly it will be precisely these ideas that will serve as a starting point for a whole historical period of progress in physics.

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This article is devoted to Albert Einstein the scientist, but in our day science has become so closely bound up with social life that we cannot by-pass his public activity.

He was forced to leave Germany after the Nazi coup d'état because the Hitler propaganda machine attacked him, calling him a propagandist of the "Jewish outlook" and an "accomplice of the communists." The Nazi secret police tried to kidnap him from Belgium, where he had at first sought sanctuary. Later he settled in the USA, where he ardently opposed fascism in all its manifestations. In 1943, when it was suspected that Nazi Ger-

many was developing an atom bomb, Einstein wrote a letter to President Roosevelt in which he insisted on the need for accelerating the efforts of the Allies to harness atomic power. At the same time, Einstein clearly realized that the atomic weapon was a terrible menace to mankind.

When the Second World War ended Einstein said that the war was over, but peace had not been won. Throughout the post-war years this great scientist vigorously came out for peace, against war, against the manufacture and use of atomic weapons, appealing to the common sense of governments and people. Debunking the advocates of the "cold war," he said in 1950 that it was impossible to secure peace if one constantly expects war. Einstein warned later that the atomic arms race meant suicide for America. He said that if the scientists who made the bomb failed to have it banned, they would pass a death sentence on themselves and their science.

Einstein was not only a great scientist. He was a man of principle who strove for social justice, a man with a fearless mind and conscience. In his public statements he invariably underlined the moral responsibility of the scientist for the events taking place in the world.

Albert Einstein will enter the history of the 20th century not only as a brilliant scientist but also as a staunch champion of peace.

# Cybernetics and Society

By A. I. Berg

Cybernetics, or "the science of control," is known to American readers chiefly through the work of Norbert Wiener of the Massachusetts Institute of Technology. This article, prepared by a group at the Scientific Council on Cybernetics of the Soviet Academy of Sciences headed by Academician Berg, appeared as a full-page article in a Soviet newspaper. It discusses the basic concepts of cybernetics, its applications, and the administrative measures that have been taken to promote its study in the USSR. [“Cybernetics and Life,” *Ekonomicheskaiia Gazeta*, June 12, 1960—slightly abridged.]

## Control Processes

Modern society is characterized by complex technique and industrial engineering, by the interaction of multitudes of people participating in economic and administrative-political activity, by the use of great quantities of material and power resources. Thus, problems of management play a constantly increasing role in the life of society. The successful solution of these problems is particularly important for a socialist society in which the whole economy is operated on the basis of a single state plan. During the early years of Soviet power, Lenin strongly emphasized the need to create a science of the principles of socialist management, and the importance of extensive studies of the organization of labor in general and of managerial labor in particular.

The importance of industrial engineering and proper management are especially underlined in documents of the 20th and 21st Party Congresses, Party Plenums, and decrees of the Council of Ministers of the USSR.

*With the present level of development of technique, the possibility exists for radically improving the management of*

*enterprises and institutions through the extensive automation and mechanization of engineering and administrative jobs.* This requires, on the one hand, a profound theoretical study of management processes which lend themselves to automation, and on the other, the creation of technical mechanisms capable of rationally performing these processes. These mechanisms must collect information on the flow of the managed process, present it in a form convenient for further use, analyze the possible variants of managed operations and select from among them the most rational ones, that is, those which have the most favorable effect on the process. The control mechanisms then apply the particular variant selected.

There is no need to feel that this involves the elimination of human beings from the sphere of control of the national economy. For it is man who will set the tasks for the machines and will determine the methods of solving them. It is man who must see to it that the machine has all the necessary data. Finally, it is man who will ensure the proper functioning of the machine. Under these conditions the machine will become an effective aid to man in the planning and operational guidance of the national economy, in the reckoning of output, in procurement operations, as well as in the collection and preliminary processing of economic information. It is not difficult to imagine how sharply the productivity of managerial labor will grow under these conditions.

The introduction of machinery in the sphere of management is inconceivable without the extensive utilization of the achievements of present-day science, in particular of electronic computing technique, mathematical methods and cybernetics.

#### **What Is Cybernetics?**

The word "cybernetics" is derived from the Greek *kubernetes*, that is, "steersman." This word was taken over by the American scholar, Norbert Wiener, the founder of cybernetics, from the Greek philosopher Plato.

*Cybernetics is the science of the purposeful control of complex developing systems or processes.* Such systems and processes exist in the most varied form in nature, in technology, and in human society.

In the first case this refers to complex physiological, biochemical and biophysical processes connected with the vital activity of organisms and operating to maintain and perfect them under changing conditions of existence. In the second case this refers to the control of machines and systems of machines. In the third case—to the control of production processes and the organized activity of groups of people performing some particular concrete tasks (accounting-statistical, planning, financial, insurance, trade, transport, and others).

Thus, cybernetics is a science which is aimed at increasing the effectiveness of man's activity in the sphere of control. The practical application of this science in a socialist society can promote a highly rational organization of economic life, substantial economies of resources, and the release of millions of working people for genuine creative activity.

Cybernetics arose at the junction of different branches of science contiguous with control processes and capable of being utilized in the study of these processes. These branches include the physiology of the higher nervous system, the theory of automatic regulation, the general theory of communication, mathematical economics, radio-technics, electronics and several branches of mathematics. Cybernetics has caused these sciences to converge and has stimulated their further development. Within cybernetics there have arisen and developed new, fruitful scientific trends closely linked with those cited above.

At the same time, cybernetics has no intention of replacing the sciences with which it is so closely interwoven.

Cybernetics may be provisionally subdivided into three principal divisions: *theoretical*, *technical* and *applied*. The first includes the philosophical problems of this science, its mathematical and logical foundations. The second refers to the concrete technical means used in the control mechanisms. The third is connected with the application of the theoretical findings and technical features of cybernetics to the solution of problems of control in the various branches of science and human activity—in economics, technology, linguistics, biology, medicine, etc.

The philosophical problems of cybernetics have to do with determining its place in the system of sciences, with the role of modern technology in its development. They include general methodological problems, and in the first place, those connected

with determining the role of mathematical and experimental methods in cybernetics, as well as the analysis of its basic concepts such as "control system," "information," and others; criticism of idealist distortions in cybernetics, the development of which actually proceeds in accordance with the methodology of dialectical materialism; the philosophical conclusions suggested by this development, in particular those involving the relationships between causality and expediency, chance and necessity, entropy and order, and other general categories.

Cybernetics is a science which studies complex developing processes exclusively from the standpoint of the mechanism of control, making extensive use of the methods of the exact sciences and experimentation. Therefore, any study of the philosophical aspects of cybernetics must rest on a concrete and profound knowledge of what it deals with.

The development of cybernetics revealed that the questions arising in various branches of science and connected with the study of control processes involve a common set of problems. To uncover common regularities required the introduction of new concepts and new methods of investigation. This called for the extensive application of mathematical thought in cybernetics.

#### ***Cybernetics and Mathematics***

In recent years we have witnessed a tremendous expansion of the spheres of application of mathematics and an enrichment of its methods.

Many branches of science which were far removed from mathematics until recently have now adopted a mathematical approach to problems and because of this are achieving new important results. This is a clear confirmation of Marx's comment that "a science attains perfection only when it is capable of utilizing mathematics."

In the solution of cybernetics problems it is necessary to use many branches of mathematics—mathematical logic, the theory of algorithms, the theory of large numbers, topology, functional analysis, the theory of probability and mathematical statistics. Mathematical ideas which were developed earlier in connection with the internal requirements of mathematics itself, frequently find a new sphere of application and become tools of applied mathematics.

Some mathematical disciplines which for a long time were considered abstract (mathematical logic, for example), have been put to important practical use with the development of cybernetics. This has led to their intensive growth. The development of cybernetics has already stimulated progress in mathematics as a whole and will do so even more in the future. A number of fields have arisen in connection with the development of cybernetics. These include the theory of information, the theory of automata, the theory of control systems, programming for electronic computers, as well as methods of decision making and operations analysis, including linear and dynamic programming, the mathematical theory of games, the theory of mass servicing, and methods of modeling real processes in mathematical machines. Cybernetics is contiguous with the mathematics of calculating techniques which is concerned with methods of automating programming. New disciplines are also developing in connection with cybernetics—mathematical economics, mathematical biology, and mathematical linguistics.

#### **Exact Methods in Planning**

*Economics is one of the most important and promising areas of application of cybernetics.* The growth of the socialist national economy, the increasing complexity of its structure, have produced a situation in which the control of the economy is an increasingly difficult and responsible task, a task which can no longer be adequately handled by simply increasing the number of managerial personnel. The science of control can be of tremendous help here.

Under socialism, economic development is determined and guided by the state plan which embodies the policy of the Communist Party in the sphere of economic development. Therefore, the chief area of application of cybernetics in the socialist economy is that of national economic planning. The preparation of the plan must be based on timely information which is adequate in total volume and in detail, information which is precise. The preparation of such information is the chief task of accounting and statistics, which together with planning are the most important areas of application of cybernetics.

The planning and control of the Soviet economy are pursued in accordance with objective economic laws. Under socialism the

law of value operates, and commodity-money relations as well as finance and credit play an important role. These areas must also become important spheres of application of cybernetics.

Some are skeptical about the possibilities of utilizing the methods of cybernetics in economics. Such skepticism is defended by references to the complexity of economic processes and the difficulty of expressing them mathematically. Such arguments, however, are not convincing.

With the present level of scientific development, many economic processes can, in one degree or another, be expressed mathematically on the basis of a profound qualitative analysis. And this means that the methods of cybernetics are applicable. In this connection we must bear in mind that modern computing technique can yield substantial results only if it utilizes methods of economic calculation that correspond to its possibilities.

The elaboration of cybernetics methods of control in the national economy has now acquired tremendous importance.

Here we must point to the creation of methods of optimum planning which make it possible to distribute assignments among enterprises in such a way as to yield maximum total productivity while observing the assigned proportions in the output of different products.

These methods can also be used in deriving optimum plans on a small scale: in some cases the productivity of an enterprise can be increased by 10 to 15% by the rational distribution of assignments among the individual production units. The use of analogous methods also permits the reduction of unproductive expenditures of valuable materials.

Methods of calculating inter-industry relationships and optimum transport shipments are being worked out, as well as methods of using electronic computers to calculate social costs of production in order to create economically substantiated systems of prices. In accordance with a directive of the State Committee on Questions of Labor and Wages, computations on Electronic Computer M-2 are under way in the Academy of Sciences of the USSR to gauge the effect on wages of wage-scale adjustments in the principal branches of industry.

The central economic organs have recently begun to make increasing use of the methods of cybernetics. The Central Statistical Administration of the USSR, for example, has prepared an

*inter-industry balance of production and distribution.* On the basis of this balance and with the use of electronic computers, information will be obtained on total inputs in production for a group of 180 products. With such data we will be able to prepare many variants of a fully balanced production plan in accordance with the projected national income.

Experimental calculations have been made of optimum freight transportation schedules for coal, cement, gravel and other building materials. According to preliminary calculations, *planning shipments with the aid of computers will save billions of rubles in transportation expenses.*

Cybernetics methods are also applicable in the operational management of transport or dispatching operations, including the preparation and operational adjustment of numerous documents (for example, railroad time-tables, plans for preparing rolling stock).

Because of the urgent need to automate various types of auxiliary operations connected with the management of the economy—accounting and computing operations, the release and registration of relevant documentation, the collection and transmission of information, etc.—a special decree was promulgated in December 1959 calling for the further mechanization of accounting, planning-designing and engineering-technical jobs.

Research has demonstrated that the methods of cybernetics will permit a fundamental improvement in the planning and organization of supply operations in the national economy.

However, *the rate at which cybernetics is being introduced into our economy is by no means satisfactory.* We must be fully aware of the significance which the application of cybernetics can have in the area of the peaceful economic competition between socialism and capitalism. We must immediately begin work on preparing a single classification of economic sectors and products, on studying the principles of deriving and transmitting statistical and financial information, on fundamentally improving these processes on the basis of the most recent achievements of cybernetics and radio-electronics. We must greatly expand the area of research in methods of processing information and organize an extensive network of economic computing centers equipped with modern computing equipment.

*The introduction of cybernetics into economics will substan-*

tially improve the management of the national economy and will make it possible to realize more fully the fundamental advantages of socialism over capitalism.

#### ***Urgent Problems***

The extensive application of cybernetics in science and in the national economy is impossible without a corresponding technical base. Such a base encompasses, above all, electronics, computing equipment, and communications equipment. The creation of such complex cybernetics systems as universal rapidly-operating computing machines, has posed a number of difficult tasks, the solution of which requires the use of the whole arsenal of resources of modern technology. Rapidity of operation, reliability, cheapness, small dimensions and weight—these are the many, frequently contradictory features required of these systems. Thus, we must persistently improve the available technical resources and elements and look for new ones.

The application of new principles of physics offers great promise, in particular the physics of semiconductors, low-temperature physics, molecular electronics, parametric phenomena in non-linear oscillating systems, and others. The creation of new elements also requires searching for, studying, and introducing new materials.

The necessity of accumulating and preserving diverse information in electronic computing and control machines dictates the search for new elements and principles of constructing memorizing equipment. Work on creating rapidly functioning and reliable methods of imparting and extracting information from electronic computing machines is also of great urgency. The possibilities of cybernetics mechanisms are now frequently limited by the imperfect nature of these mechanisms, particularly in the case of economic calculations. We must search for new logical principles of building control systems, in particular, methods of synthesizing electronic schemes out of diverse elements, the theory of coding, etc.

The problem of reliability occupies a central role among the problems of technical cybernetics. Electronic control machines consist of hundreds of thousands of components which carry out billions of elementary acts in the process of control. If some

particular element is in a state of disrepair, this may result in a distortion of the whole control process and even serious accidents. It must be bluntly stated that the inadequate reliability of the available resources of electronic automatic machines substantially restricts the possibility of utilizing them for control purposes.

The study of the reliability of complex control systems is now a problem of prime importance. It can be met either by using more reliable elements or, and this is particularly important, by creating reliable systems from unreliable elements. The latter aspect of research is particularly characteristic of cybernetics.

### **Cybernetics Machines**

The future of comprehensive automation is closely linked with the designing and introduction of cybernetics machines of the electronic program-control type. Man will be freed not only from heavy and fatiguing physical labor, but also from many types of one-sided mental labor; he will be free to pursue the highest forms of intellectual activity. The use of cybernetics machines will permit a tremendous increase in labor productivity and will make it possible to perform processes which are unattainable without machines.

Let us present some examples of cybernetics machines.

*Dispatching machines* for controlling transportation, power supply, hydro-technical systems, etc., permit the operation of technological processes under the most advantageous operating schedules.

In recent years the first *information machines* have been created. These are designed to collect, systematize, preserve, and yield every possible type of information. This would include data on scientific publications, patents, and various kinds of observations. The need for such machines arose in connection with the avalanche-like growth of every type of scientific and technical information. It is enough to point out that the number of registered patents alone exceeds 15 million. Without information machines it is impossible in actual practice to keep up with this vast amount of material.

So-called *recognition machines* are an interesting category of cybernetics machines. They are capable of identifying a par-

ticular object with images which had been presented earlier. These include reading machines which recognize letters and numbers, as well as machines which recognize the sounds of speech.

#### *Mathematics in the Service of Linguistics*

Of great significance are information machines which permit *automatic translation* from one language into another, including translation into artificial languages. The whole complex of such problems, generally covered by the term "machine translation," is now being intensively elaborated. The machine translation of scientific-technical texts is now being conducted (as yet in an experimental manner) in the USSR, USA, England, Japan, China and Czechoslovakia.

These and similar highly complex problems are connected with the processing of information which is preserved and circulated in human society in verbal form. Therefore, a considerable part of this task constitutes essentially one problem, which can be broadly formulated as follows: *to teach electronic machines a human language*.

Linguistics, the science of language which is coeval with human culture, has acquired a new significance and new character. It has ceased to be a purely humanistic, descriptive discipline, far removed from the development of technology and the exact sciences. We now require from linguistics that it formulate the laws of language in an exact form; only then will they be able to be used in electronic equipment. To meet this requirement linguistics must use the methods and concepts worked out by the exact sciences and, above all, by mathematics. The groundwork for introducing new methods is being laid by the leading trend in modern language study, so-called structural linguistics. It is vitally necessary to reform the training of language specialists and to take a number of organizational measures. Recently the Presidium of the Academy of Sciences of the USSR decided to create a special *Institute of Semeiotics in which cybernetics problems of linguistics will be studied through the combined efforts of linguists, mathematicians, logicians, and representatives of other sciences*.

**Control of Biological Processes**

It is particularly important to study the great diversity of control processes in living nature, for every kind of vital activity requires well-ordered control.

Cellular life, the development of the organism, the behavior of living creatures, the evolution of living nature as a whole—all these are processes occurring under the effect of specific control processes.

Biology is characterized by a multiplicity of stages of control. Each cell has its control system; in the first place there is the chromosome apparatus containing hereditary data. Every organ consists of a number of cells. It has its own control apparatus which affects the cells composing it in a certain manner. The organism as a whole has its own control system—nerve regulation—which coordinates the interaction of individual organs.

The functioning of each of these control processes, obviously, consists of several acts of a physical-chemical nature and is subject to general natural-scientific regularities.

The detailed study of the structure of control systems of living nature is also of interest because it offers the hope of acquiring knowledge of the principles of organization of the most complex control systems.

A whole series of illnesses result in the breakdown of the normal operating functions of the organism. For example, diabetes is characterized by a disorder in the transformation of sugar. As we know, the hypophysis controls the processes of growth. The breakdown of the normal functioning of the hypophysis leads to excessive growth in some cases and to pygmy characteristics in others. Many have suggested that some cardiovascular diseases, the development of malignant tumors, certain forms of nervous ailments, as well as hereditary diseases such as crescent-shaped hemoglobin, hemophilia, and others result from the breakdown of certain control functions in the organism.

For the treatment of these illnesses it is extremely important to know how the normal control of the organism's vital activity functions and what breakdowns occur during the state of illness.

In this sense, *cybernetics offers new possibilities for treat-*

*ing many illnesses*; it provides methods of deriving a comprehensive picture of the illness from the observation of individual symptoms. New prospects of controlling physiological and pathological processes in the organism are arising.

Cybernetics is closely linked with problems in the study of reflexes, the physiology of the sense organs and the nervous system.

The ideas of cybernetics are playing an important role in the study of the phenomena of heredity. We know that the transmission of characteristics through heredity is controlled by hereditary data transmitted from parents to the young through the sex cells. Knowledge of how hereditary data function in the process of individual development of the organism and in its later life activity is extremely important for controlling the heredity of the organism. In this way, by combining selection with direct physical-chemical influences on molecules—the bearers of hereditary data—it will be possible to produce many valuable types of animals, plants and micro-organisms. As compared with direct selection, this will require substantially less time and resources.

#### ***Interaction of Man and Automata***

The study of control processes in living organisms will, in turn, prove of value in the development of technical cybernetics. At the present time, *the creation of automata capable of independently deriving optimum control regimes (so-called self-organizing systems) has acquired great importance*. Determining the principles of operation of the brain will be of great help in working out this problem. Physiological research in this area has already provided the foundation for designing self-learning automata capable of independently learning their surroundings and preparing new programs for their operation under certain conditions.

In the light of the problems of automating control processes, a profound study of the interaction between man and automata is required. This includes special studies connected with evaluating the reliability and speed of human reactions, as well as studies of the speed and reliability with which information can be processed by humans.

Cybernetics devices and instruments can replace individual human organs, for example, while an operation is being performed. Diagnostic machines will be of great help to the doctor in diagnosis, particularly in the early stages of illness. *Cybernetics opens up new prospects for the use of instruments which will permit the painless study of various functions of the human organism, simultaneously considering a large number of indices and symptoms.*

Making use of bio-electrical phenomena which arise in muscular activity, Soviet scientists have already created artificial limbs capable of performing highly intricate movements. New electronic devices are appearing which make it possible for the blind to read. Cybernetics devices will be of tremendous use in experimental research. Thus, devices were created which systematically studied the blood pressure and heart beat of the dog Laika during its cosmic flight.

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Cybernetics is a young science, but one which has a very bright future. At present, in the period of its intensive initial development, it requires special attention. This is particularly the case because the early assimilation of the ideas of cybernetics was marked by misunderstandings in our midst and was so dragged out that it undoubtedly harmed our science and technology. The dissemination of the ideas of cybernetics is of great importance, but it is extremely important that this be done in a responsible and skilled manner, and with a deep knowledge of the actual state of affairs in this field. The appearance of publications distorting cybernetics is absolutely inadmissible.

Work on cybernetics in our country is proceeding on a large scale. A Scientific Council on Cybernetics has been set up in the Academy of Sciences. The problems of this science occupy the center of attention of groups of scholars in Moscow, Leningrad, Kiev, Erevan, Tbilisi, Gor'kii, Kharkov, Tallinn, Riga, Novosibirsk and other cities. However, the pace of research activities, the utilization of the ideas and methods of cybernetics in the various branches of science, in technology and in the national economy, are still far from adequate.

We must take all the necessary measures to strengthen the Soviet school of cybernetics so that in a short time it can firmly occupy the leading place in world science.

## What's Wrong With Our Medical Services?

This article by the editors of a widely-read literary publication supports readers' criticisms leveled at the conservatism of public health officials and the inadequate attention paid to areas like psychotherapy and gerontology. ["You Are Wrong, Comrade Minister," *Literaturnaia Gazeta*, June 6, 1960—abridged.]

Let us recall the gist of the matter. In the past year our paper, *Literaturnaia Gazeta*, published about a dozen articles and notes on medical topics. They were written by doctors, writers, newsmen and public personalities. They seemed to be about different things. In one case the authors spoke of treatment of old age, in another, about some valuable medicine that was not being introduced, in a third about a new method of treatment. It is quite likely that some of the suggestions were debatable and required careful examination. But they all shared one thing in common. They exposed shortcomings and tried to help the health offices in their noble work. And that is the only attitude that should be taken to these exposures, the aim of which is to eliminate red-tape and the slightest growth of the ulcers of bureaucracy in such sacred territory as institutions whose duty it is to safeguard human health. That is the main thing!

Regrettably, however, we did not receive a single answer to any of these articles in the past year and were obliged to address pertinent inquiries directly to Comrade S. V. Kurashov, the USSR Minister of Public Health. It was his "Answer to Readers" that we published on April 26.

It is not a polemic fervor but an awareness of the extreme importance of this matter that has now obliged us to return to this topic. We are called upon to do so, moreover, by letters we

have received expressing dissatisfaction with the Minister's answer.

It stands to reason that in so short an article as this we cannot investigate the different degree of importance of the problems that were raised in our newspaper in the past year. However, this is not the main thing. The main thing is that to all intents and purposes we have not received a direct answer to any of the articles carried. What these articles spoke about was the manifestly unsatisfactory state of affairs as regards the introduction of inventions and new methods of treatment at some of the institutes and departments of the USSR Ministry of Public Health.

In his "Answer to Readers," the Minister rejects all the criticism except for the reproach that answers are delayed. This criticism was rejected without any sufficiently convincing argument. For this, he has been justly chided by our readers.

Let us go back to the articles which the Ministry rejected either directly or indirectly.

Do you remember what the writer A. Iugov and Prof. V. Rozhnov wrote in their articles "The Doctor and the Spoken Word" and "The Spoken Word as Doctor"? They wrote of problems that absorb the attention of many medical scientists and practitioners, of the extremely poor use which health institutions make of such a powerful curative as the spoken word and about the need for medical students to acquire a deeper knowledge of psychotherapy. In a nutshell, the question involved the practical use of psychotherapy. "We learn," Rozhnov wrote, "that there is neither space nor time to practice psychotherapy."

Is that really so? To see how right Rozhnov is, one need merely enter any room of any out-patients' polyclinic and watch a doctor at work. According to the established quota, a therapist is expected to examine six patients, a surgeon ten, and a nerve specialist five, in the space of an hour. In the time allotted the patient has to undress and dress, and tell the doctor his complaints, while the doctor must examine him, fill in the case-sheet, make out a prescription, give advice and so on and so forth.

How can one use the power of the spoken word in such conditions!

In this sense the problem of extensively applying psychotherapy and of having it practiced at health institutions is

directly related to another problem, that of reducing the work load of the doctor and of freeing him from paper work. This is a question which both doctors and patients keep returning to—but alas!—without results so far.

However, what did the Minister say in reply?

"In his article 'The Spoken Word as Doctor' the author (V. Rozhnov) explains to the layman the importance of the spoken word in medical practice and suggests that instruction in psychotherapy be included in the educational program of medical colleges. We find it hard to believe that the psychiatrist, Prof. Rozhnov, who is a Doctor of Medicine, does not know of the great importance attached to the spoken word as a curative during instruction in clinical disciplines. As for psychotherapy as a means of treating various diseases and ailments, that, as a rule, is the psychiatrist's concern. Medical college training does not provide for teaching the students, the future doctors, a narrow specialty. The doctor becomes a specialist after he begins practicing. Accordingly, the Ministry of Public Health finds that it cannot accept Prof. Rozhnov's suggestion."

But was it this that A. Iugov and Prof. Rozhnov spoke of? And can one interpret such a broad community topic as that raised in the articles "The Doctor and the Spoken Word" and "The Spoken Word as Doctor" in such a narrow way? We are sure that psychotherapy must be the concern not only of psychiatrists but of all doctors whatever their specialty. Moreover, how could one "not accept" a doctor's suggestions on methods of improving medical practices?

However, when comparing the articles with the answer, one unfortunately discerns again the same tendency to decisively "not accept" criticism and suggestions, and the desire to ward off public interference in medical affairs.

Was there a "rational kernel" in K. Nemira's letter about the fate of a method worked out in Novosibirsk to treat eye-burn? We think there was, and unquestionably so. The man who wrote the letter, a Siberian writer, told us about a new effective method for treating eye-burn that was evolved by the Novosibirsk doctor A. Milovidova and her colleagues. This method has won recognition in Poland, Czechoslovakia, and the GDR. But in the country of its birth it unfortunately "has not become widespread," as K. Nemira writes. "There has been no official

sanctioning of it nor has the Learned Medical Council of the USSR Ministry of Public Health issued any instruction on this score."

An attentive and impartial investigation of this case would have been of unquestionable value because Nemira's letter would have led to other, similar facts. Indeed, is this the only instance demonstrating how conservatism and indifference block the introduction of some new progressive methods of treatment?

However, K. Nemira's criticism is also held to be groundless, for the answer says:

"It is common knowledge that the introduction of new methods of treatment which have won the recognition of the medical community does not require any special legalization or an order from the Ministry. Hence it is clear that there are no obstacles in the way of the widespread application of the 'Novosibirsk method.'

This, however, is fundamentally wrong! To popularize and introduce new methods of treatment you need both "special legalization" and unfailing supervision to see that these methods are used. Incidentally, one of the obligations of the Learned Medical Council was precisely to consider and approve new methods of treatment. Now that the Learned Medical Council has been abolished, this is the responsibility of the USSR Academy of Medicine and its central institutes.

The whole trouble is that often a new method of treatment is merely given formal recognition.

The treatment of old age presents another exciting problem. Doctor V. Kuleshov wrote about it, as did a group of old Bolsheviks in a letter to our paper.

In his "Answer," Minister Kurashov agrees that the problem is "of great social significance, the importance of which is enhanced by the fact that the increase in life expectancy in our country naturally leads to an increase in the number of aged people." Though the problem has been recognized as one that is important and vital, still all criticism is also sweepingly rejected.

The group of old Bolsheviks raised several concrete matters in their letter which was called "Waiting for an Answer." Why don't the clinics of the medical institutes and the big city hospitals and out-patient polyclinics have departments dealing with

gerontology and age pathology? Why aren't services provided for everybody over 40 to prevent and treat old age? But there was no answer to either these or other concrete questions.

The Minister, though, says the following:

"As for the suggestion that we set up special departments in the hospitals for chronic patients, we proceed from the premise that patients should not be divided into 'chronic' and 'acute' categories."

Kuleshov had noted, however, the need to establish special hospitals for chronic patients because they are really and truly neglected. As for dividing patients into "chronic" and "acute" categories, regardless of whether this classification is accepted officially or not, there are chronic patients and the question of services for them is exceedingly acute.

Thus, after rereading the articles on medical topics that we published in our paper in the past year and reading the "Answer" to them, the only conclusion one can draw is that all the proposals and criticism which the readers addressed to the Ministry of Public Health are dismissed as being groundless.

Can such an attitude to press exposures and public criticism be tolerated?

The resolutions of the Party Congress specifically say that "questions relating to cultural services, public health, physical training and sports, should be tackled with the active and broad participation of public organizations."

The "Answer" does not encourage such activities at all. It sings one clear tune to the effect that innovations supposedly do not call for any particular concern from the Ministry.

"I think," I. Morozova justly remarks in a letter to us, "that every ordinary citizen realizes the following: If somebody in the Soviet Union has found an effective means for treating one or another disease it should be verified by scientific medical institutions, and if approved, the public health offices should popularize it and take every step to have it practiced at the health institutions. Only then will all practitioners in the Soviet Union learn of the achievements of their colleagues. Why, then, does the 'Answer to Readers' say that the introduction of new methods of treatment does not require any special legalization or order?"

Morozova is right. It is not so easy for the new to make

headway unless assisted. You have to fight for the new! The results are sad when this is not so.

A short while ago the Presidium of the Central Council of the USSR Society of Inventors and Innovators discussed the question of how the USSR Ministry of Public Health was applying inventions recommended, in this particular case, not by individuals, but by such an authoritative body as the Committee of Inventions and Discoveries of the USSR Council of Ministers. Before this took place a special commission of the USSR Society of Inventors and Innovators thoroughly inspected everything the USSR Ministry of Public Health was doing with respect to inventions. The results were rather disheartening.

"At the Ministry these affairs are in a very bad way," N. Savel'eva, the head of this commission, said. "Suffice it to note that 249 inventions have been awaiting the 'appropriate conclusions' for nearly eight years now. Nobody was punished for this red-tape and furthermore 128 inventions were lost altogether in the depths of the Ministry."

Isn't it obvious that there is a direct connection between the questions that our readers have raised and the facts discussed by the Presidium of the Central Council of the USSR Society of Inventors and Innovators?

If the USSR Ministry of Public Health not only pigeonholes but even loses dozens of valuable suggestions, does not Comrade Kurashov think that this is the direct result of the wrong attitude of the Ministry's leading officials to public participation in medical affairs?

By energetically enlisting the public to take a hand in the work that the health offices are doing, and by reacting properly to press exposures the Soviet health offices will be able to tackle their vast Seven-Year Plan tasks better and faster.

That is why, Comrade Kurashov, the readers are legitimately dissatisfied with your answer.

## A Soviet Sociology Seminar

Sociology has not been taught as a distinct discipline in Soviet universities in recent decades. This note from a Leningrad University Journal suggests increasing interest in this field by Soviet scholars. ["On the Work of a Sociology Seminar," *Vestnik Leningradskogo Universiteta, Seriya Ekonomiki, Filosofii i Prava*, 1960, No. 1.]

For more than a year now a sociology seminar has been working at Leningrad State University. Organized on the initiative of a group of university personnel, the seminar includes specialists in various branches of learning—philosophers, economists, jurists, teachers, etc.—academic people as well as practical workers interested in conducting multifaceted sociological studies. Following the organization of the All-Union Sociological Association, the seminar came to be regarded as its Leningrad branch. The work of the seminar is led by a committee at the head of which is Professor V. P. Rozhin.

The task of the seminar is to conduct concrete sociological studies of the most vital problems of our day, problems on which the scholars of Leningrad are working. Among the principal areas scheduled for investigation are: changes in the composition of the working class (age composition, educational level, etc.); prospects for the development of public education; marriage and family relationships; causes of criminality, etc. The study and generalization of concrete material will obviously require a considerable period of time, particularly because no methodology has been worked out for dealing with these questions. Thus, the papers presented to the seminar last year were of a preliminary and provisional nature. Nonetheless, most of them aroused considerable interest.

Professor B. G. Anan'ev's paper contained a many-sided treatment of education as a social problem and of the means of

developing Soviet schools in connection with the reorganization of the educational system. Professor M. D. Shargorodskii's paper on the causes of criminality and measures to combat it also included some pithy and fresh ideas. Both papers aroused lively exchanges in which practical workers took part. In particular, lathe operator G. F. Landezii made some interesting points on M. D. Shargorodskii's paper. The seminar also heard reports by Assistant Professor I. S. Kon on major features and tendencies in current bourgeois sociology and by Professor G. E. Glezerman on "The Subject of Historical Materialism."

We cannot be satisfied, of course, with all of the seminar's work. Concrete sociological studies are still developing very slowly, so that references to the need for such studies appear more often than the studies themselves. The work of the sociological seminar is still inadequately linked with the broad areas of community life, and without this it is impossible to conduct large-scale, multifaceted research requiring the participation of many people. The Leningrad student body takes almost no part in the seminar's work. There are also some other problems, but these are normal problems of growth.

The development of concrete sociological investigations is urgently necessary, for a communist society can be consciously built only on the basis of a profound and comprehensive generalization of the concrete experience of the masses' historical creativity. This is what constitutes the link between social science and life, between social science and the practice of communist construction. This is the link called for by the historic decisions of the 21st Congress of the CPSU.

### **Soviet and British Historians to Meet**

This note reports on the papers to be delivered at a joint conference of Soviet and British historians in Moscow. [“Anglo-Soviet Conference of Historians in Moscow,” *Voprosy Istorii*, 1960, No. 6.]

An Anglo-Soviet conference of historians will be held in Moscow early in September 1960. This conference will be the counterpart of a conference of British and Soviet historians held in London in September 1958.

The National Committee of Soviet Historians, the Institute of History of the Academy of Sciences of the USSR, and the National Committee of Historians of Great Britain have agreed on an agenda and program for the conference. Soviet historians will present the following papers: 1) "The Spread of Christianity and the Struggle With Paganism in Rus in the 11th and 12th Centuries" (Academician M. N. Tikhomirov); 2) "Russian Geographical Discoveries in Asia, From Unpublished Archives" (Corresponding Member of the Academy of Sciences of USSR, A. V. Efimov); 3) "Russia and Great Britain in the Near East in the First Half of the 19th Century" (A. F. Miller, Doctor of Historical Sciences); 4) "The Revolutionary Situation in the Late 50's and Early 60's and the Reform of 1861 in Russia" (Academician M. V. Nechkins); 5) "The Formation and Development of the Anti-Hitler Coalition During the Second World War" (Professor E. A. Bolgin).

English historians will present the following papers at the conference: 1) "The Early History of European Cities" (Member of the British Academy, Professor F. Grierson); 2) "English Feudalism in the 15th Century" (Professor K. B. MacFarland); 3) "The Industrial Revolution and Political Life in England" (Professor H. J. Habakkuk); 4) "Russia and Great Britain in the Near East in the First Half of the 19th Century" (Dr. J. H. Bolsover).





